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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,140	08/27/2004	Ching-Hung Kao	NAUP0622USA	5139
27765	7590	11/29/2005		
NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER NGUYEN, TRAM HOANG	
			ART UNIT	PAPER NUMBER
			2818	

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/711,140

Applicant(s)

KAO, CHING-HUNG

Examiner

Tram H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 15-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### **Election/Restriction**

1. Applicant's election of species A<sub>1</sub> claims 1-14 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

### **Drawings**

2. The drawings are objected to because in Fig. 4, reference numeral 103 of the gate finger 102 is not drawn inconsistently as drawn in the other 103 of the gate finger 101.

Appropriate correction is required.

### **Claim Rejections - 35 USC § 112**

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 4, 9 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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**Claim 4** recites the limitation " ...extends laterally on the said gate " on line 4.

There is insufficient antecedent basis for this limitation in the claim.

**Claims 9 and 10** recites the limitation " ...wherein the said gate " on line 4.

There is insufficient antecedent basis for this limitation in the claim.

Since there are more than one gate mentioned in their independent claim, the examiner has treated the 'said gate' as 'gate finger' for the remainder of the Office action.

Appropriate correction is required.

### **Claim Rejections - 35 USC § 102**

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-7 and 9-12 are rejected under 35 U. S. C. § 102 (e) as being anticipated by Gau et al. (U.S. Patent No. 6,882,029).

Regarding to **claim 1**, Gau discloses:

A junction varactor (fig. 4) comprising:

a gate finger lying across an ion well of a semiconductor substrate (reference numeral 102); a gate dielectric situated between said gate finger and said ion well (reference

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numeral 102b); a first ion diffusion region with first conductivity type (reference numeral 116) located in said ion well at one side of said gate finger, said first ion diffusion region serving as an anode of said junction varactor (reference notation Anode); and a second ion diffusion region with a second conductivity type (reference numeral 112) located in said ion well at the other side of said gate finger, said second ion diffusion region serving as a cathode of said junction varactor (reference notation cathode).

Regarding to **claim 2**, Gau discloses all the limitations of the claimed invention; plus, the ion well has said second conductivity type (fig. 4, reference numeral 112; col. 5, lines 26-27).

Regarding to **claim 3**, Gau discloses all the limitations of the claimed invention for the reason above; furthermore, the said ion well is electrically isolated by shallow trench isolation (col. 4, lines 13-15).

Regarding to **claims 4 and 5**, Gau discloses all the limitations of the claimed invention for reason above; Gau further teaches a first/second lightly doped drain (LDD) having said first/second conductivity type in said ion well, and wherein said first/second LDD merges with said first/second ion diffusion region and extends laterally to said gate. (col.6, lines 26-30).

Regarding to **claim 6**, Gau discloses all the limitations of the claimed invention for reason above; moreover, Gau also teaches said junction varactor comprising a spacer located on sidewalls of said gates (col.6, lines 31-33; fig. 4, reference numeral 102a).

Regarding to **claim 7**, Gau discloses all the limitations of the claimed invention for reason above; and also disclose the said junction varactor comprising a salicide layer (fig. 4, reference numeral 103) formed on said gate and on said first and second ion diffusion regions(col. 3, lines 47-67).

Regarding to **claims 9-10**, Gau discloses all the limitations of the claimed invention for the reason above; except for the said gate is a metal/poly-silicon gate. It would have been an obvious matter of design choice to choose the gate material as metal or poly-silicon, since applicant has not disclosed that metal/poly-silicon gate solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with metal/poly-silicon material.

Regarding to **claim 11**, Gau discloses all the limitations of the claimed invention for the reason above; in addition, Gau also teaches said conductivity type is N type and said second conductivity type is P type (col.6, lines 19-21).

Regarding to **claim 12**, Gau discloses:

A junction varactor (fig. 4) comprising:

An N well formed in a semiconductor substrate (reference numeral 100); a first gate finger lying across said N well (reference numeral 102); a first gate dielectric interposed between said first gate finger and said N-well (reference numeral 102b); second gate finger lying across said N well at one said of said first gate finger (reference numeral 101); second gate dielectric interposed between said second gate finger and said N-well (reference numeral 101b); a P<sup>+</sup> ion diffusion region located in said N well between said first and second gate fingers, said P<sup>+</sup> ion diffusion region (reference numeral 112)

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serving as an anode of said junction varactor; a first N<sup>+</sup> ion diffusion region (reference numeral 116) located in said N well at one said of said first gate that is opposite to said P<sup>+</sup> ion diffusion region; and a second N<sup>+</sup> ion diffusion region (reference numeral 114) located in said N well at one said of said second gate that is opposite to said P<sup>+</sup> ion diffusion region, wherein said first N<sup>+</sup> ion diffusion region and said second N<sup>+</sup> ion diffusion region are electrically couple together and serve as a cathode of said junction varactor (col. 3, lines 56-58).

### Claim Rejections - 35 U.S.C. § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 8 and 13-14 is/are rejected under 35 U.S.C. 103 (a) as being unpatentable over Gau.

Regarding to **claim 8**, Gau discloses all the limitations of the claimed invention for the reason above; except for when operation, said gate of said junction varactor is biased to a gate voltage  $V_G$  that is not equal to 0 volt. However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to preset the gate voltage  $V_G$ , since Gau disclose the same exact junction varactor

structure as the present invention. Therefore, such modification and variations can be made without departing from the spirit of the invention.

Regarding to **claims 13-14**, Gau discloses all the limitations of the claimed invention for the reason above except for in operation, said gate of said junction varactor is biased to a gate voltage  $V_G$  that is not equal to 0 volt and the said gate voltage is  $V_{cc}$  which is known as a positive voltage (pg. 6, par. 24, line 7 of the claimed invention spec.) However, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to preset the gate voltage  $V_G$ , since Gau disclose the same exact junction varactor structure as the present invention. Therefore, such modification and variations can be made without departing from the spirit of the invention.

### **Conclusion**

9. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tram H. Nguyen whose telephone number is (571)272-5526. The examiner can normally be reached on Monday-Friday, 8:30 AM – 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's



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supervisor, David Nelms can be reached on (571)272-1787. The fax numbers for all communication(s) is (703)872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.



Tram H. Nguyen  
Art Unit 2818  
11/09/05



David Nelms  
Supervisory Patent Examiner  
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